

# DRAGON USER

International edition

*The independent Dragon magazine*

96p US\$3.25 September 1985

**Machine code  
word processor**

**The Dragon's ROM —  
part one**

**Flex revisited**

**Dragon answers**

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and Screening Adults

## Editorial

"Our intention is to be at the first 8088 Dragon with a 128K Dragon  
running hard disks and files."

Fighting words from Ted Gorychod — but what do they really mean for  
the Dragon owner?

If he can do it, then it means the Dragon is back with a vengeance.  
What's more, Sunhard seems to be committed to producing a 128K  
Dragon too — though they don't seem too sure whether it should be 8088  
or 8086.

Add to this Compuserve's commitment to a hard disk interface, floppy  
disk drives from Pace and Radford, new disk formats from Eurohard,  
the so called Dragon 8088 machine, and sundry developments from independ-  
ent companies, and the Dragon's future begins to take on a real hue.

But, at the risk of repeating something that has been said before in this  
column, is this what the ordinary Dragon user wants?

If it means that the Dragon 32 is relegated to the cupboard, then there  
certainly are a lot of Dragon User readers who won't like it.

Then again, if it means the continued development of new Dragon  
machines, compatible with the existing ones, then there are just as many  
readers who will be all in favour of it.

Perhaps the single word — compatibility — is the most important.  
Eurohard should take a lesson from Atari and Commodore — the C128  
runs Commodore 64 software, giving it thousands of programs even  
before its launch, and the 128K runs Atari 8080, 800 and 400 software.

If a 128K Dragon is produced, then it has to use at least some of the  
existing software for the Dragon 32 or 64.

There must be a Dragon 128 — it is the logical next step in the evolution  
of the Dragon family of machines. But it should be a progression, not a break  
with the past.



## Fantasy Fight

PERHAPS the little taker in the June issue of Dragon User I have found a way to enhance your lists when playing the game Fantasy Fight by Cable Software. I have also found the memory location for the 35 spells, and also the respective weapons and spells. The memory locations are as follows:

**MEMORY LOCATION USE**  
**\$H80C7** The number of the screen on which you start  
**\$H80C8** The number of bits that you start with  
**\$H4700** Red keys  
**\$H4706** Blue keys  
**\$H4708** Green keys  
**\$H4710** Yellow keys  
**\$H4712** Lightning bolts  
**\$H4714** Fire  
**\$H4716** Ice  
**\$H4718** Wind  
**\$H471A** Earth  
**\$H471C** Water  
**\$H471E** Air  
**\$H4720** Fire  
**\$H4722** Ice  
**\$H4724** Wind  
**\$H4726** Earth  
**\$H4728** Water  
**\$H472A** Air  
**\$H472C** Fire  
**\$H472E** Ice  
**\$H4730** Wind  
**\$H4732** Earth  
**\$H4734** Water  
**\$H4736** Air  
**\$H4738** Fire  
**\$H473A** Ice  
**\$H473C** Wind  
**\$H473E** Earth  
**\$H4740** Water  
**\$H4742** Air  
**\$H4744** Fire  
**\$H4746** Ice  
**\$H4748** Wind  
**\$H474A** Earth  
**\$H474C** Water  
**\$H474E** Air  
**\$H4750** Fire  
**\$H4752** Ice  
**\$H4754** Wind  
**\$H4756** Earth  
**\$H4758** Water  
**\$H475A** Air  
**\$H475C** Fire  
**\$H475E** Ice  
**\$H4760** Wind  
**\$H4762** Earth  
**\$H4764** Water  
**\$H4766** Air  
**\$H4768** Fire  
**\$H476A** Ice  
**\$H476C** Wind  
**\$H476E** Earth  
**\$H4770** Water  
**\$H4772** Air  
**\$H4774** Fire  
**\$H4776** Ice  
**\$H4778** Wind  
**\$H477A** Earth  
**\$H477C** Water  
**\$H477E** Air  
**\$H4780** Fire  
**\$H4782** Ice  
**\$H4784** Wind  
**\$H4786** Earth  
**\$H4788** Water  
**\$H478A** Air  
**\$H478C** Fire  
**\$H478E** Ice  
**\$H4790** Wind  
**\$H4792** Earth  
**\$H4794** Water  
**\$H4796** Air  
**\$H4798** Fire  
**\$H479A** Ice  
**\$H479C** Wind  
**\$H479E** Earth  
**\$H47A0** Water  
**\$H47A2** Air  
**\$H47A4** Fire  
**\$H47A6** Ice  
**\$H47A8** Wind  
**\$H47AA** Earth  
**\$H47AC** Water  
**\$H47AE** Air  
**\$H47B0** Fire  
**\$H47B2** Ice  
**\$H47B4** Wind  
**\$H47B6** Earth  
**\$H47B8** Water  
**\$H47BA** Air  
**\$H47BC** Fire  
**\$H47BE** Ice  
**\$H47C0** Wind  
**\$H47C2** Earth  
**\$H47C4** Water  
**\$H47C6** Air  
**\$H47C8** Fire  
**\$H47CA** Ice  
**\$H47CC** Wind  
**\$H47CE** Earth  
**\$H47D0** Water  
**\$H47D2** Air  
**\$H47D4** Fire  
**\$H47D6** Ice  
**\$H47D8** Wind  
**\$H47DA** Earth  
**\$H47DC** Water  
**\$H47DE** Air  
**\$H47E0** Fire  
**\$H47E2** Ice  
**\$H47E4** Wind  
**\$H47E6** Earth  
**\$H47E8** Water  
**\$H47EA** Air  
**\$H47EC** Fire  
**\$H47EE** Ice  
**\$H47F0** Wind  
**\$H47F2** Earth  
**\$H47F4** Water  
**\$H47F6** Air  
**\$H47F8** Fire  
**\$H47FA** Ice  
**\$H47FC** Wind  
**\$H47FE** Earth

To use these locations first load the program and press enter. To gain extra lives type **POKE \$H80C7, 100** plus the number you require and poke **\$H80C8, 100** plus the number of the screen you wish to start on. However, on some screens your starting position is already in the middle of a board, so be careful when using this location. Then type **POKE \$H4700, 1** and the game should run. Pressing these keys performs a wait and start ritual of a total wait of 30000, only is required a second time around.

To use the total wait for the different spells, add 20 to the same poking of the program must be done. As the program has a system which clears most of these locations in memory. First load the program and press enter as before. Then type in the following statements without a line number:

**FOR I = \$H80D0 TO \$H80D0  
 OR **POKE \$H80D0, 1**  
**FOR I = \$H80D1 TO \$H80D1  
 OR **POKE \$H80D1, 1**  
**FOR I = \$H80D2 TO \$H80D2  
 OR **POKE \$H80D2, 1********

I would recommend that you save the program at this point to give you a changed copy for future use to do so type:

## COAXIAL FANTASY

Then you can use the locations. As before, poke the location with the number you require.

Before you start, some words of warning. When using the above locations, make sure that the value does not exceed 127 in any point in the game, as otherwise the spell or weapon becomes useless. It is also advisable to only poke the value 1 into the locations that refer to the sword, staff and bow. Also make sure that the value you give into the location **\$H80C8** is pretty small (say < 1000), as otherwise the program crashes to some unknown state.

Adam Lee  
 24 Farnington Road  
 Bantock  
 Chesham  
 (0494) 647

## Printer Control

HAVING just read your review of *Printer Control* in the August issue I feel I must comment on one important point.

The version of the program supplied to your reviewer was only compatible with the Epson 844 graphics type printer. The version was supplied because this is the most common. However, there are variants for other printers. If a customer does not state his printer type when ordering I ask him for it before dispatching. It has been suggested to me that ROM based programs are more prone to crashes than RAM based ones (as on tape or disc). I don't know why. Indeed, while it is a BASIC interpreter, I am not a ROM based program and it is perfectly reliable. As indeed is my Dragon 32 in any other application. It has also been suggested that the program is rather sensitive to mains voltage fluctuations (as the printer plug apparently only ground against voltage fluctuations). I have a feeling that it is not a good idea to ground against mains voltage fluctuations.

There is also a version which drives a daisy-wheel typewriter or printer. The daisy-wheel cannot produce the graphics but it still gives text positioning, underline and access to special characters.

Any reader has only to ask — I will gladly advise.

William MacGowan  
 MacGowan Consultants

## Data?

IN YOUR editorial in the June Dragon User, the increasing scarcity of Dragon software you comment on the need for a club of repair agents. This is commendable, and perhaps Computerize the Dragon supporters will do so. There is another aspect of the scarcity of Dragons that seems to have had little attention or none at all, saving data. Test figures and circuit diagrams are most difficult even impossible to acquire. Undoubtedly your readership in clubs will many users complain to us than our servicing and I would like to suggest that you publish a series of articles and circuit diagrams to help them and to interest others.

John A. Young  
 (Sheffield) 100

## Not so Super?

IF I MAY say this to test of other readers' experiences with the Super Writer II word processing program. On paper, this is a superb piece of software (computer WIP program). I have used or examined its program. I have found it to be almost unusable because it crashes with data regularly despite using help from Dragon Data. In the past, and Touchmaster more recently, it has been suggested to me that ROM based programs are more prone to crashes than RAM based ones (as on tape or disc). I don't know why. Indeed, while it is a BASIC interpreter, I am not a ROM based program and it is perfectly reliable. As indeed is my Dragon 32 in any other application. It has also been suggested that the program is rather sensitive to mains voltage fluctuations (as the printer plug apparently only ground against voltage fluctuations). I have a feeling that it is not a good idea to ground against mains voltage fluctuations.

A further suggestion is that there may be a fault in the cartridge connections in my

computer, which I can't write as Super Writer II is the only cartridge program I have ever used.

Robert Hedges  
 4 Lister Street  
 London E8 6DR

## Mnemonic

MANY THANKS for showing the little fact that my Dragon User (June issue) contains an incorrect instruction. The hex code 80 (decrement) as LDC instead of the 8080 (load) should be. To correct this, load the program into memory and apply the following four POKEs to the load address + 2537 onwards and re-save the corrected version. For example, if your version loads at 10000 as per the original listing:

**LOAD \$H10000  
 POKE 14538, 80  
 POKE 14539, 80  
 POKE 14540, 80  
 POKE 14541, 80  
 CSA VCR: \$H10000, 1, 1000  
 1, 1000, 1000**

We apologise for not spotting this many months ago when I first compiled the issue.

Pam D'Angry  
 21 Wycombe Lane  
 Wycombe Green  
 High Wycombe  
 Bucks HP12 3HD

## Jigsaw

HAVING read your review of Jigsaw from Vidgoz I feel that I must put finger to keyboard and express my disagreement at your conclusions. I purchased Jigsaw in the last 5000 issue and have had many happy hours trying to complete the puzzle provided with the game.

I agree that the idea of a jigsaw on a computer seems unworkable. But the author has produced a very enjoyable game of a very recent date (June). Although Jigsaw isn't everybody's cup of tea, I am sure there are many people who prefer them to the arcade games we have to come used to.

Roy Coates  
 25 Clervy Road  
 Delphinstown  
 Liverpool L19 5UN

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All the above include Dragon compatible DOS and controller (with cables in ROM), instruction guide and all connecting cables. All drives include integral power supply. Other systems available - please ring for full details.

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# News desk

If you have any new products for the Dragon — software or hardware — ring the News Desk on 01-437 4343.

## Eurohard — plans ahead

**EUROHARD's** Chief of Development, Jordi Marfany, was on a working holiday in London last month between visiting various companies working on Dragon hard and software he found time to drop into the Dragon UserOffice.

The next machine to be launched by Eurohard, Jordi said, will be a Spanish Dragon — the will be the Dragon 200. There will also be a Dragon 200 E with cassette A portabyte board with an 80 column card built in.

Eurohard is also planning the next stage on in the development of the Dragon — "the new machine may be a Dragon with 128K. It may use the 68000 or the 68010 — we have not yet begun the project."

ment of development. Jordi stated.

On the imminent front Eurohard has written a new Dragon BIOS. It's a little slower than the old BIOS because we have added a verification routine, he said.

The new Dragon DOS is in production now. We may be changing or upgrading the EPROMs on old machines, but no final decision has been made as yet.

Eurohard is also marketing new versions of the Dragon disk drive. "We have double sided 80 tracks, double sided 40 tracks and a single sided 40 tracks — that's three different types. We will be playing with 5 disks for the time being but we may go for different formats in future."

Jordi also said that Eurohard has been selling a considerable amount of business software in Spain and in Europe.

He warned however that Dragon users in the UK appear to be being patronised with Eurohard. Eurohard is trying to get the most for the Dragon but it takes time to develop new systems. When the development is finished there will be new machines on the market.

In the meantime people who have technical queries can contact Jordi at Eurohard in Spain. Write to Jordi Jordi Marfany, Jefe del Grupo de Desarrollo Eurohard SA, Ctra. Barrio de la Cruz 262, Caser de Calatrán, Cáceres, Spain.

## British board

**TED COMPTON** of CompuShare has said that he is "fairly certain that the Eurohard machine from Eurohard will be the 128K model we had made up."

We should have 100 128K upgrade boards ready by the end of August, he said. Our next project is the word processing board.

Our intention is to be at the end of 1985 with a 128K Dragon. Adding hard disks and files, he stated.

Ted would like to hear from Dragon owners throughout the country just what it is they want from the Dragon — you tell us what you want and if there is enough demand we'll do it.

## DRAGON 200 - E

### Dragon's welcome

**BOB MORGAN** of the Mid Wales Tourist Council has arranged a holiday with a twist as he jotted 'Dragon' names.

Called *Bring Your Dragon Home*, it's a weekend package at a country house built in Mid Wales the day awarded in October.

There will be talks and demonstrations by people working on new developments for the Dragon, and opportunities to get hands on experience with new hardware and software.

The main aim is to make Dragon users more productive and to give the machine a bit of publicity.

Bob himself is an enthusiastic Dragon user and has a Dragon IIc plus disk drive, Plotter and CSD.

The cost is anticipated to be about £400 for the weekend and anyone interested should contact Bob Morgan, Marketing Information Officer, Mid Wales Tourist Board, Caernarfon Road, Gwynedd, Mackintosh, Pwllheli, Gwynedd, Pwllheli, Pwllheli.

## Eddy steady go!

**EDDY**, the hero of Incentive Software's *Blackback*, has been busy recently.

First of all there was the trial of the *Blackback* competition. For all of you who have never seen the game it involved helping Eddy to escape from various mazes. Those who managed to reach the final screen were eligible to enter a competition — the first four players for whom we got their computers a chance to fight it out for a Quantum 2 disk drive.

The eventual winner was Nigel Ward of Wokingham, Berkshire. He completed the first two parts of *Blackback* in eight minutes and nine seconds — a total 22 seconds in three of his fastest runs.

Eddy will be making a comeback in Incentive's next Dragon game, *Eddy Steady Go!* This is a 21 screen maze game with over 60 levels of difficulty. It features moving platforms, falling objects, lava pits and sea saws.

*Eddy Steady Go!* will be released in the beginning of October at £19.95. Contact In-

centive Software, 44 London Street, Reading RG1 1SD.



Nigel Ward

## Dumper

**MACDOWAN** Consultants, which recently released *Porter Control* for the Dragon, has a new program — *Dumper*.

*Dumper* will dump screens to printer and as a database code reconvertible program which users can incorporate into their own database or machine code programs, whether on tape or disk. *Dumper* gives the user the facility to specify what part of the screen desired and how large the printout is to be.

Like *Porter Control*, *Dumper* is available for just about any printer — MacDowan will configure the program for each purchaser's requirements.

*Dumper* costs £5.00 plus 10p postage and packing from MacDowan Consultants, 4 Antenn Drive, Caythorpe, 66 Gainsborough, Lincs NG22 9DQ.

## Flex word processor

**THE LATEST** program from Compuserve is a new Word Processor for Plus.

It features an interactive spelling checker, an easy to use full screen editor, comprehensive formatting facilities, and a logical

utility which allows users to search for or look at documents on disk while using the word processor program.

*Word Processor for Plus* costs £79.95 from Compuserve.

# Coding the words

Peter Whittaker with a machine code word processor for your Dragon

IF YOU have a printer to go with your Dragon, then it is likely that you have already started to experiment with the potential of your Dragon to add text for you. As I have to write a lot of essays at college, I have written this wordprocessor program to make the task of essay writing much easier. The main program is configured to run with the Dragon Disk system connected but by entering the Pascal the program can be altered to work with a tape recorder instead. The program resides from ADDRESS 10000 to 10000, so if it is run without disks, then you must POLEAR, before loading and EXECuting the program. It runs with disks from the POLEAR command and it could start will protect the program. Two strong advantages of this program are that all the keys will now auto-repeat, and that the text is printed in green on a black background.

## 'MENU' Screen

When the program is first EXECed, it will display the MENU screen. This gives access to the main load/print and input text routines. Pressing any <C> calls the EDITOR screen (see below). Pressing

<I> will print out all a readable file everything so far typed into the computer. If the <END OF> key is held down the loading will pause until the key is released. When the end of the text is reached, the program will automatically go into the text input mode. Pressing of any of the vertical arrow keys with the shift also depressed will return to one of the MENU/EDITOR screens. (UP arrow for MENU Down arrow for EDITOR). Pressing the <C> while the MENU screen is displayed will put the program straight into text input mode, leaving first printed the last page of text entered.

Pressing the <C> will send the text to the printer. The program is set up for an 80 column printer, and will print out a 10 character margin, and 70 characters of text (if a word would be split at the end of a line, the program will hold it over to the start of the next line). If you are using a Sanyo printer then it is possible to increase and decrease width print on a line. The program is also set up to print 55 lines of text before printing 150 lines to pass on to the next sheet. Once the last key of been pressed, the program returns to the MENU screen.

Pressing <C> or <S> will call the text save and text load routines. It is important to ensure that the cassette recorder or disk drive is ready for use BEFORE entering the name of the file to be loaded or saved. File names must be eight characters long. After saving text, the program returns to the MENU screen, but after loading and text the program will print it out to the screen to be read.

## 'EDITOR' Screen

This bluegreen screen is easily distinguished from the bright yellow of the MENU screen. Pressing <C> will return to the MENU screen. The functions called from this screen involve moving a cursor through the text to select the point at which the editing is to be done. This cursor will remember its previous position in the text each time it is used. The cursor will remain in the centre of the screen at all times, and the text will scroll underneath it being directed by the arrow keys. A message is continuously displayed at the top of the screen to remind you just which of the editor functions you have called and a similar message at the bottom of the screen displays the ASCII code and CHR\$ of the character under the cursor. The up and down arrows move the text up or down one line at a time, whilst the left and right arrows move the text one character at a time. If the arrow keys are used with the shift key depressed, then the vertical arrows move the cursor to the start/end of text and the left and right arrows find

## 4500 'WORDPROC' <DISC> MEMORY DUMP. BY PETER WHITTAKER

4115	2455000001010000=	131	4340	200000245440000=	795
4124	0000000024544000=	359	4349	1014270075010000=	635
4132	2454000000000000=	164	4356	0000002100007000=	747
4140	0000002454001000=	489	4364	5743544340000000=	577
4148	0F10000000000000=	812	4372	4940544000000000=	575
4156	0701490000000000=	446	4380	2014004200004540=	482
4164	0700000000000000=	784	4388	5445500000000000=	685
4172	0000000100044000=	1872	4396	4941004000074140=	543
4180	0000001000000000=	882	4404	5400000000000000=	518
4188	0004000000000010=	773	4412	2004454040407000=	581
4196	1000000000000000=	1857	4420	7004000000000000=	581
4204	0000001000000000=	1855	4428	1000000000000000=	838
4212	0000000100000000=	969	4436	0400000000000000=	726
4220	3107100100000000=	557	4444	0000000000000000=	1201
4228	3010000000000000=	497	4452	0000000000000000=	340
4236	2700000000000000=	318	4460	3000000000000000=	673
4244	0001001000000000=	629	4468	2454001000000000=	638
4252	0700101440000000=	953	4476	0010100000000000=	740
4260	0000104100000000=	735	4484	0100100000000000=	527
4268	0000002454001000=	643	4492	1000000000000000=	439
4276	0004000000000000=	685	4500	0000000000000000=	562
4284	0001000000000000=	877	4508	2000014000000000=	312
4292	0010000000000000=	323	4516	0100000000000000=	481
4300	1000000000000000=	789	4524	0100000000000000=	457
4308	0000000000000000=	859	4532	0100000000000000=	457
4316	1000000000000000=	695	4540	0100000000000000=	533
4324	0004000000000000=	679	4548	0F10100000000000=	616
4332	1400000000000000=	731	4556	0000000000000000=	783



the start of either the text or the last paragraph (CARE/10) — Inserted

Pressing <C> calls the Delete text routine. Move the text under the cursor until it is over the first of the letters which are to be deleted. Press the <ENTER> key to mark the spot. This will be advised by a BEEP. Move the text again until the cursor is one character past the text later to be deleted and press <Delete> again. Once the text has been deleted the program will return to the EDITOR screen. If you imagine the program be deleting text out of a sheet of real paper, then the cursor would act along the left-hand edge of the paper each time the <Enter> is pressed. Once text has been deleted, it cannot be retrieved.

Pressing <I> enters the Insert Text mode. Once again the cursor must be positioned over the text by pressing the arrow keys, and then pressing <Enter> to mark the spot. Inserted text will begin where where the cursor is in the text, and the character under the cursor will come after the inserted text. When the <Enter> is pressed, the screen will clear to black and text can then be typed in. When the <Break> key is pressed, the text will be entered into the main body of text, and the program will return to the EDITOR screen.

Pressing <M> calls the Move Text routine. This is a combination of the two previous routines. First the cursor is positioned to delete a block of text, and once this has been removed the cursor is

```
1A HEX'LOADER FOR 'WORDPROC' MEMOS
Y CURP, B: PETER WHITTAKER
20 INPUT"START ADDRESS".START
30 INPUT"FINISH ADDRESS".FINISH
40 FOR N=START TO FINISH STEP 9
50 PRINT N;" "
60 TT=0 INPUT A# 250
70 FOR M=1 TO LEN A# STEP2
80 L=VAL"MH"+MID A# M,2,2
90 TT=TT+L POKEN+2,L
100 Z=Z+1 NEXT M
110 PRINT" "
120 INPUT T
130 IF T>TT THEN PRINT error = GHT
    ER LINE AGAIN:GOTO50
140 NEXT N
```

repositioned to reinsert the block in its new position. Blocks of up to a thousand characters can be moved around using this routine. Pressing <C> calls the Text Copy routine which performs a similar function, but does not delete the text before copying it to some other part of the memory.

Pressing <E> calls the Type Over routine, which enables the correction of simple spelling mistakes. The program will at usual display a screen full of text with the cursor at its centre, and as before the text can be moved by passing the arrow keys. Pressing any other key will change the character under the cursor for that of the key pressed. Pressing <Break> will

end the routine, and return to the EDITOR screen.

The Search and Swap routine is called by pressing the <F> key. This will then prompt you for a word to be searched for. Answer this by entering the correctly spelt word and finish with the <Enter>. Then enter the correct spelling of the word, and finish this also with the <Break>. The program will then swap all occurrences of the first word for the second. Be careful, however, for the program is quite happy to make some terrible blunders. For example, if you search for 'author' and swap for 'writer' the program will also change 'authority' to 'writerity'. The only limitation with this function is that it will not swap words of

4564	8C883F5A26FA8F1B=	988	4812	9DA634183888889F=	913
4572	1A2182278F86AF8F=	939	4820	8A84841CF8888888C=	1257
4580	888878888A88888888=	645	4828	8888888888888841C=	1028
4588	8F8888818C371C8D=	787	4836	F888853F351888888=	1113
4596	888F818827588818F=	558	4844	3F1818F88888888C22=	689
4604	27588C181C2888F81=	763	4852	48494C4C4E414848=	977
4612	382788888888188F8=	594	4860	8E42494E2288888C=	849
4620	8238818F1A188A8D=	491	4868	8D18418884E288F88=	833
4628	80888F88C18288881=	763	4876	8888C1881888888518=	971
4636	48871828881888513=	581	4884	8812F48C138C8888=	994
4644	8888888888F88C182=	788	4892	8418888C8288F888=	957
4652	8881488718288814C=	701	4900	841CF888C4873518=	1851
4660	788E7F18288C1818=	68F	4908	8F88888888888888=	945
4668	1828FF3818888888=	784	4916	88888F181418F8C1=	785
4676	88878181988F8788=	682	4924	8888888888888888=	639
4684	81871819188F888C=	747	4932	28C8888888888888=	738
4692	82F71818288A8881=	684	4940	8F88888888888888=	889
4700	8F718188888888848=	659	4948	8F88888888888888=	797
4708	53455234288448883=	574	4956	888F77F8818882518=	615
4716	432828288434E5445=	469	4964	188827F888888888=	938
4724	528848434C45284E=	512	4972	3887A4381F588887=	763
4732	4148488888884144=	518	4980	81882714C188278F=	664
4740	88F88C8884313138=	842	4988	81882788818C2707=	785
4748	28C5323538C8FF88C=	985	4996	8F88888888888888=	885
4756	2834313137288888=	286	5004	888C88C888888888=	883
4764	812248484C454841=	658	5012	888A28F88888C888=	1128
4772	4045223C38388888=	428	5020	18418884478F8888=	825
4780	3C414428C88888418=	337	5028	8E18F88888888888=	1122
4788	88C78818418884E2=	991	5036	388F8888881F8888=	882
4796	8F888888812418888=	917	5044	3888888888818827=	884
4804	63188E128888C138C=	831	5052	F881712747813227=	755

If one letter or length. However, the good point is that the search and swap words need not be the same length. It is possible to search for Peter and swap the Foolish Pal First.

Pressing the <C> will display an EDIT screen, and you will have to press the <C> again to leave the program. Pressing any other key will return you to the EDITOR screen. This is to prevent accidental exiting from the program. However, if you do exit the program accidentally and wish to input a word losing all your text, then <ESC>4151 instead of the usual <ESC>412.

## Text Input Mode

Because the print routine takes care of wordwrap and page spacing, there is no need to worry about the end of lines when typing in text. The current text position is marked by a steadily flashing question mark (?). To delete text just hold down the <Left Arrow> key, and the cursor will slide its way backwards. However, the cursor does not take account of linefeeds. <CR>(13) as it moves backwards, so if deleting back over a new paragraph it is wise to check how far back the cursor has really gone by pressing <Shift 5 Up Arrow> to call the MENU screen, and then <C> to display the end of text.

There are several keys with special functions which can be called from the text input mode. The <Ctrl> key produces a <CR>(13) which is the carriage return code for the E flag. This is so that you do

not have to wait the printer to go on for E. The next key of consequence is the <Shift Right Arrow> which prints <CR>(14), the code for double width text. <Shift Left Arrow> prints <CR>(15) for normal width text. The <CR>(14) is printed to screen as a REG block, and the <CR>(15) as a BLUE.

Pressing the <Clear> key calls the special character routine. The bottom of the screen will display the code to be entered at the next input location. This can be changed by pressing the up or down arrow keys. Pressing those with the shift key will change the code in jumps of 10. Press the <Enter> to select the code displayed. These special keys can be used with the Editor functions to insert text as well.

The final special key to remember is the <Right Arrow>. This calls the glossary routine. A prompt is printed using the bottom of the screen, and the program waits for an input. Pressing the <C> clears the glossary of all its contents. Pressing the <L> puts you into glossary input mode. The screen will close to write and wait for you to input the key letter (eg E). This type of the phrase to be called by this letter (eg. Etymological explanations). Press <CR>(13) to enter the phrase, and the computer will return to the text input mode. The next time you press the <Right Arrow> follow it with <L> and the computer will add 'Etymological explanations' to the end of the text. There is space for a glossary of about a thousand

characters before I will start to overwrite the last memory. Once you have built up a useful glossary you can reload the program by <C>(54)545555 WORKPROG; 5075 5010 4-42. Now when the program loads I will also load in the glossary with it.

One last point, if the Program ID 5140000 or crashes (because you pressed the RESET button) then it can be restored without losing the current text by <ESC>4125. Happy typing.

## Program Alteration

The margin width is stored at &H1017 and the printer width 2 is stored at &H110F. The number of lines of text in a sheet is stored at &H1031 and &H1032 contains the number of lines including blanks on a sheet. Location &H1033 contains the code word when the <Shift C> is pressed. It is currently set up to print a C on a feedback printer. Lastly of the program keeps returning to the MENU screen, and will not let you enter any more text. This is not a bug it is because the text memory is full (4000-4500 words) and the text will have to be saved and the memory cleared before typing can continue.

## Too much of a Challenge?

If YOU do not relish the task of typing in all this data, then I will be happy to supply a copy on tape (both disk and tape versions), for £1.00 including p&p. (86 Upper Holly Walk, Lexington Spa, Warwickshire CV34 1J).

7499	74991381827815381=	566	5308	1300058818888551=	543
7498	3418778141812518=	467	5316	6788189098882558=	838
5875	2788888138182781=	719	5324	88518162805888828=	634
5884	6881381827815381=	694	5332	67888888818888328=	521
5887	37101782882881838=	593	5340	8098881888888881=	642
5178	434443544732831=	584	5348	3F18808488238887=	433
5188	3838444540485445=	499	5356	84188F8888381F8C=	726
5116	385445588428424C=	531	5364	8C28208538818C18=	557
5124	4F4348888813818=	633	5372	7218F86328484448=	739
5132	88848388185C8818=	667	5380	544F32283282840=	469
5140	8888188288187216=	383	5388	4F5452848404F43=	784
5148	8F7828484448544F=	783	5396	48884F4828844888=	528
5156	5228322828484853=	462	5404	74887F1828851788=	482
5164	4352542854455854=	582	5412	188884838818C88C=	656
5172	28424C4F43488888=	537	5420	18888518788851828=	714
5180	141818884838818=	428	5428	182F8418188F8C=	1844
5188	5C88178888173181=	867	5436	178C881791818828=	637
5196	8028F38F18248818=	758	5444	F88F182488188388=	837
5204	728888818418884=	792	5452	18888818F218F848=	886
5212	888F88888888C288C=	782	5460	28454448544F7328=	519
5220	88888188274C1888=	538	5468	24282848F488888=	463
5228	8888188F1828188=	624	5476	424C4F4348284F4C=	544
5236	2731813F27E38158=	884	5484	288445885488F18=	588
5244	27E3818827E18188=	889	5492	288E158418858482=	453
5252	37D8F1882738818C=	458	5500	8C175C8818888818=	914
5260	27E38113273F8158=	558	5508	78C8188F1828F888=	612
5268	273F8113273F8788=	647	5516	88C178C8817318188=	788
5276	8C173F8818888C18=	828	5524	24F88F1824881382=	748
5284	1825888F18288818=	783	5532	8818888818F218F8=	1885
5292	728C188288188818=	753	5540	4F28484448544F52=	731
5300	F88388188F284888=	1226	5548	283728284F584852=	467

5556	2054595245808E15	538	6044	543082308528BC18	788
55564	45180624408201855	648	6050	14340888F181432805	747
5557	80174080173191837	778	6059	2880842208F8080808	752
5558	978561AC25785973F	564	6063	182885893FF3848484	824
5558	18282880180808080	878	6076	8F24542785801787	571
5559	1800801018087318	731	6084	58585888808080C10	644
55594	28707172853484152	686	6088	88288818858888827	758
5572	448482841484482835	487	6108	153888185181482808	523
5582	57415888828454828	485	6188	88881888888888885	531
5583	485528853484172435	549	6114	1884888275878884F	1823
55834	485884188884188888	511	6124	7804F88888F1880879	893
5584	88284548784828280	446	6172	18188888888888888	746
5585	58458884148485480	585	6148	8017878888F888888	696
5586	48482848887485844	579	6149	88888834183888888	717
5588	88888888888888888	547	6158	8F888888841C7F8888	1188
55884	27F8818387488F18F	753	6164	8F8C75188888888887	731
55884	18827F81481581827	688	6172	FF8C283431313828	682
55882	8F88881527F138818	774	6188	8822282288888824	386
55882	2715418827178188	387	6188	5418FF4F888181418	888
55887	27188888888888888	812	6198	8F48388188488180	817
5714	028588F788888888C	1824	6284	1827F3F888C181428	634
5724	82878888888888888	834	6212	F1881F1CFF358882	946
5732	88888888888888888	760	6288	81801887FF28888C4	679
5748	88888888888888888	862	6288	548CF388811CFF828	738
5748	88888888888888888	538	6288	188F888888888888C	104F
5754	18418888888888888	562	6244	88818F88888881878	838
57544	88158780888788888	1188	6258	8888858888848841	858
5758	88888888888888888	1827	6268	58414384448888827	549
5758	98878888888888888	778	6288	28273881534884888	464
5758	381888F1888888888	476	6278	28434F84445288828	411
57584	8F888888818888888	537	6284	2828881888182231	348
57584	F8888888888888888	713	6288	3F188C88888888888	449
5814	1888F18888828418	536	6388	1884188F18238384	733
5814	88888888888888888	813	6388	88888F18888888887	797
5828	88143878888888888	788	6318	88188881882878888	751
5828	8888F1884984188818	836	6324	8238881780881731	785
5834	28484888818881888	468	6372	818828F88F1884888	861
5834	88F4388188F1888888	884	6348	1A738817318188288	581
5834	1888F18884188F188	685	6348	F88F1888881A73888	1813
5838	24881888888188818	518	6358	182488C18888888818	358
58384	88888888888888888	738	6364	8818828188F182488F	694
58384	881888F182828F888	744	6372	188488182488F1828	835
58382	18288481888881888	856	6388	888F182418881828	557
5838	8827128188F271881	481	6388	88888788188888881	861
5838	8827128188F271881	475	6388	25F88F1881438888C	721
5848	35888888888888888	887	6484	388C8888888888888	488
58484	F48888F288888888888	1118	6412	88181828888182888	734
5852	8C8888F288888888888	1114	6428	1814188818248817	358
5858	81882738188888888	611	6428	F81814F018148181	688
5858	188F18228881878881	624	6438	888888821888	

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6732	2854458554284255=	548	7028	188E8528188F8888=	738
6848	4646455229495328=	511	7829	8D88E90D8888278=	1175
6848	46464542828285448=	493	7896	813F27591281827=	528
6896	4154284243472528=	469	7844	81C89138182781D=	673
6764	5245545553464848=	631	7852	813C18278188814=	656
6572	4728544F28458444=	588	7860	258F817828F081F=	954
6588	544F552828288888=	497	7868	84881F88888C382=	1856
6588	82C8188E1824848=	594	7876	2C28C18828F5688=	818
6596	87888C182828728=	512	7884	7F71818818818288=	773
6684	34188C88883418F7=	788	7892	188E18148888878=	863
6612	181888182C88888=	628	7188	818828F8313F188F=	734
6628	818827471888C888=	632	7188	18188F181416F818=	548
6628	188F18228182728=	545	7116	2844474649464528=	431
6676	8188272F818F2712=	586	7124	474C4F83F8418258=	638
6644	8188271881828888=	684	7132	8888CF8C18418884=	757
6652	188835188F888835=	632	7148	888F8888818C888=	897
6688	1838F81818C888F7=	817	7148	88888844888F8888=	818
6688	18162812F81816C8=	564	7186	881487881F888827=	818
6676	888F18182888F18=	475	7184	2781808753818225=	581
6684	162883781818881F=	482	7172	88881C8888888C8=	883
6632	2C28828C188F288C=	815	7188	18F27C71FC8888C4=	1888
6788	8888C18F88888846=	1823	7188	1FC1882888FC8888=	874
6788	3418388C888F8F88=	597	7196	C88883F888882885=	632
6716	88841CF888888835=	1827	7384	8C18F27C288FC8888=	598
6724	188F883888728388=	738	7312	C488C888288F8888=	1846
6732	454348414C284348=	521	7328	1888C888813F188C=	781
6748	4158414354453828=	546	7328	888828F8881C8888=	761
6748	434F444528882328=	468	7336	88888888882F8888=	585
6756	8F8C883431313828=	682	7344	8888CF8D8888C2888=	873
6764	3828282238888888=	547	7352	88882888882F2888=	988
6772	34183888888F8F88=	587	7368	34221888888188C=	584
6788	88841CF888888835=	1162	7388	8888251831888818=	745
6788	188F8838882313888=	785	7376	8F88881888888888=	687
6796	8C818888CF8D1841=	752	7384	88888F881888C8888=	812
6884	8884288F8888881F=	684	7392	258F838238881872=	785
6812	8881888888888888=	1288	7388	FC8888C488C88828=	1838
6828	8888881F88888888=	1876	7388	FC8888881C8C8888=	1813
6828	88888818F8888881F=	872	7316	8827F881831827F4=	727
6836	CF88888888888888=	1213	7324	428E1F8787888888=	1138
6844	8827F88138278316=	534	7332	88882F88888888CF=	863
6852	F88888F87814388=	1238	7348	88888C888888277F=	842
6868	8F8D184138888888=	773	7348	881C888183272888=	628
6888	8188182782341888=	492	7356	88278F8188873181=	453
6874	8788188F1822318F=	716	7364	8827831811327488=	688
6884	1827F84881881827=	675	7372	8F2788818818277F=	888
6892	F888818818278288=	748	7388	D8818827D8818C27=	788
6898	81832738818C2737=	623	7388	4347888888882888=	926
6908	81152727813C2737=	528	7386	888887888F1F818=	884
6916	818837818188878=	648	7484	8F3F187888888288=	1348
6924	8113271F88E18148C=	584	7412	881F888427883418=	718
6932	78881827F8388788=	778	7428	88C888881F8F8888=	732
6948	8F1814881884F88=	688	7428	88CF8C8888CF8888=	897
6948	842888888F288888=	878	7436	3512288F8888F888=	784
6956	8828818888888888=	1832	7444	888F88C788888788=	983
6964	18C888818888881=	878	7452	888F288F8D18C888=	1133
6972	8888188C88882888=	774	7468	88888F288888CF88=	1188
6988	88181428C7288F28=	887	7468	18418884C8888888=	754
6988	444346484C452888=	581	7476	8C1C448C8888881F=	888
6996	38434C4841382882=	431	7484	88888828F818F388=	847
7084	884538273C888882=	567	7482	28474C4F83834138=	571
7812	415347288888E1848=	431	7588	588846584C4C8888=	582



# FLEX revisited

*Roy Coates takes another look at the new official Dragon operating system, FLEX*

HOW THAT Eurocard has decided to drop Calt in favour of FLEX as the official Dragon operating system is something of a letdown at just what FLEX is.

FLEX first appeared in 1977 and was written by an American company called Technical Systems Consultants Incorporated.

It has been run on a variety of 8080 and 8085 based machines in all sorts of environments and for all sorts of different purposes. The FLEX used for this review is a custom version written for the Dragon by the London based firm Compuserve and they have added a few features to make life a little more comfortable. These include a modified 31 by 24 screen display using PROLOG graphics which is a noticeable improvement over the standard 32 by 16 Dragon display.

## Machine code chunk

FLEX is an 8K chunk of machine code residing in RAM which handles all the disk and terminal I/O. All the usual DOS commands such as CAT, LIST, SAVE and so on are stored on disk and are only loaded into RAM when they are required. This is the way in which most of the expensive real computer work and is obviously very efficient when it comes to saving valuable memory. One of the big attractions of FLEX for me is that FLEX is a very open system. By that I mean that the document also giving the entry points to all the routines contained within FLEX and all the useful functions used by FLEX is readily available in the FLEX Advanced Programmer's Guide. I don't think that you need to be an advanced programmer to deal with FLEX, as most of the things you would want to do have already been done for you. The routines are laid out in FLEX chunks of machine code operations and operations such as input a character or number, output a character or number, print a string and many more. Even the error handling is suitably simple and all these functions are very well documented.

Getting FLEX started is completely easy. Simply type **BOOT** for the Dragon version or **RUN4M FLEX** for the Datacube version, and within a few seconds the Hi-Res 31 column screen will appear with the FLEX copyright line at the top. You will be prompted for the current date. When entered the FLEX prompt **++ ++** will now appear and the system is ready for use. FLEX is very user friendly — it is difficult to make mistakes as any command which may delete a file or disk asks you twice if you are certain that you wish the operation to continue. An example of this is the **DELETE** disk command.

**delete pass ten**

**DELETE /J/T/STRT/BN/11/1  
ARE YOU SURE? (Y/N) Y  
AM I THOUGHT SO**

A FLEX file specification consists of the filename which may be up to eight characters in length, followed by a three character file type. For example:

<b>DATANAME.BIN</b>	is a machine code file
<b>MYPROG.TXT</b>	is a standard FLEX text file
<b>MYPROG.BAK</b>	is a backup file created by the editor

As well as the file name and type, other information pertaining to the file is stored such as the date of creation and the file protection allocated to it. The file may be

delete protected, write protected or catalogue protected so that they do not appear to exist on the disk at all. This file system may seem a little strange but for you have found a use for a system running FLEX on a single drive system. I all of the system utilities are catalogue protected that the system (filename, filename) and the disk appears to contain only your own files which is obviously easier and far easier to work with. The software hardware required to use FLEX using either a Datacube or Dragon cartridge is a Dragon 64 and at least one disk drive. Alternatively a Dragon 32 may be used in conjunction with the software and much as protected FLEX cartridge available from Anttek Data Design.

## Contents of the FLEX system disk.

<b>APPEND</b>	Consolidates two or more files
<b>ASMS</b>	TSC 8080 Assembler
<b>ASN</b>	Defines which disk drives are systems and which are work drives
<b>BACKUP</b>	Creates a security copy of a disk
<b>BAUD</b>	Sets the BAUD rate at which the Dragon's serial port may be used
<b>BUILD</b>	is used to create test files
<b>CAT</b>	Catalogues the contents of a disk
<b>COPY</b>	Copies files from disk to disk
<b>CS</b>	This file holds the data used for the character set used in the Hi-Res display. Eight different styles of character set are supplied
<b>DATE</b>	is used to set or display the current date
<b>DELETE</b>	Deletes the specified files from a disk
<b>DRIVES</b>	is used to tell FLEX how many disk drives are connected to the system
<b>EDIT</b>	TSC Extended Text Editor
<b>EXEC</b>	A list of FLEX commands may be stored in a normal text file and the list may be executed using the EXEC command
<b>FLEX SYS</b>	This is the core of the FLEX system and is copied into RAM when the system is booted
<b>H</b>	This presents completion of the specified command until a key is pressed so that, for example, a disk may be changed
<b>I</b>	All input for a specified command is taken from a specified input file
<b>JUMP</b>	Permits control to a machine code program at a specified address
<b>LINK</b>	is used when creating a FLEX system disk
<b>LIST</b>	Lists a specified text file
<b>NEWDISK</b>	This utility formats a blank disk for use with FLEX
<b>O</b>	Re-directs all output from a specified task to a specified file
<b>P</b>	Re-directs the output from the specified task to the printer
<b>PROT</b>	Changes the protection of a specified file
<b>RENAME</b>	is used to change the filename of a file
<b>S</b>	Re-directs all output from a specified job to the Dragon's serial port
<b>SAVE</b>	Saves a specified section of the Dragon's memory to disk
<b>SBC</b>	is single disk copy, and allows files to be copied from one disk to another on a system with only one disk drive
<b>STEP</b>	Allows the user to define the step rate for their disk drives
<b>TTYSET</b>	This utility is used to set terminal attributes if using something other than the Dragon as a terminal
<b>VERIFY</b>	Switches the verify option on or off when saving or loading a disk file
<b>VERSION</b>	Informs the user of the version of a specified utility
<b>WBOOT</b>	Deletes all files having the extension COT

The FLEX system disk supplied by Compuserge contains all sorts of useful goodies. Everything you would need to use the system is contained on the disk. There are also two special utilities provided — the test editor and the assembler. The test editor is line oriented and is a very powerful one. The assembler must be the most powerful that I ever used. Just about every feature you could want from an assembler is included.

One really useful facility is a library which gives you the ability to call other source files from within your main source file and have them included in the assembly. For example, I have a file called FLEX-LINK.TXT on my system disk which contains a list of all the FLEX routines and their addresses so that whenever I am writing a program which is to be linked to FLEX, I simply add the line

LIB FLEXLINK.TXT

to my source file and the routines stored in that file are automatically included in my assembly. This means that my program can use FLEX calls such as

JSR PSTRNG

which prints a string of text to the terminal with no need to define the entry point of the routine (PSTRNG).

Once FLEX has been loaded on a standard Dragon 64, the user is left with RAM from 0 to \$B4FF completely free for their own programs. Although the Dragons BASIC is not immediately available when FLEX is installed, a modified version called DBASIC is available on disk which has



links through to the FLEX system, to give access to disk files as well as the ability to pass commands to FLEX itself. The DBA-BASIC package also allows use of the \$1 column display which is a great improvement over the standard Dragon display. Other versions of DBASIC are also available for FLEX, for use on C, Green Cellul and many other languages. There are also many utilities available including Word processors, Text processors, Spreadsheets, Data-base systems, Assemblers and cross-assemblers, De-bugging programs and the list is growing all the time.

In conclusion after many months of using FLEX, I don't know how I ever managed without it. FLEX expands the capabilities of the Dragon by an incredible

amount, something that cannot be done with most of the other home machines. Extended has settled on FLEX as their standard operating system and Compuserge, the official Dragon importer, has been heavily involved with FLEX for many years and is continuously updating the range of software for it. For anyone put off by the price, you are getting an awful lot of software for your money and I think you have more chance of being run over by a Goatsuck than of regretting the purchase of FLEX. If I had my way, FLEX would be compulsory for every Dragon owner. Compuserge FLEX operating system, editor and assembler with DBASIC package £99.95. FLEX Advanced programmers guide £11.50.

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THE DRAGON's *Acme* contains 166 of machine code routines for handling the screen, keyboard, graphics and sound memory for Microsoft Basic. Many of these routines are extremely useful for the machine code programmer and some can even be used directly from Basic.

To use a *hardware* (ROM) routine in your own programs, it is necessary to know several pieces of information. Obviously the entry address is required but also any special entry requirements, such as registers and memory locations which must be set up and the exit conditions of the routine.

The new series of articles will tell you all you ever wanted to know about the inner workings of the Dragon. Every useful ROM routine is given as well as a complete memory map of locations used. Each aspect of the firmware will be considered individually starting this month with the cassette handling firmware. Anyone writing assembly programs with any advanced options (such as adventure games, word processors, databases and the like) will find all the relevant information here. Many of the locations given can also be *POKE'd* (and *POKE'd*) by the latest programmer to enhance a Basic program.

Each section will take the form of a memory map showing all the useful locations which are used by the routines documented followed by the firmware routine entry points and notes. Whenever possible, the Tandy CoCo (extended Basic 1.1) routine address will also be given in brackets. Generally the routines are identical on the two machines, differing only by the position in the ROM.

By the end of the series you will have a complete 'reference manual' for your Dragon computer.

## The Cassette Operating System

The Cassette Operating System (COS) routines deal with reading and writing files to tape. The various levels of the system allow reading and writing on the on-tape by character, block or word in binary. Output is via the 6 bit D/A converter and input via an input amp, crossing detector. The cassette interface operates at approximately 1500 baud (about 180 characters per second).

A standard Dragon file is made up of the following sections on tape:

- 1 A header of bytes of value \$55 (normally 128)
- 2 A filename block
- 3 A 0.5 second gap of tape
- 4 Another header of value \$55
- 5 One or more blocks of data

- 6 An End of file block
- Each block consists of the following:
  - 1 A header byte of \$55
  - 2 A flag byte at \$5C
  - 3 Block type byte
  - 4 Block length byte (0-255)
  - 5 Data bytes (up to 255)
  - 6 Checksum byte
  - 7 A trailer byte of \$55

The block type byte signals the type of information in the block: 0 = Filename block; 1 = Data block; 255 = End of File marker block. The checksum byte is calculated by summing digits 3, 4 and 5 together. This is used to detect CRC errors.

The Filename block is a special type of data block found at the start of all files. It is 15 bytes long and contains the following information:

- 1 Eight characters for the filename
- 1 A file type byte
- 1 An ASCII flag byte
- 1 A gap flag byte
- 2 Bytes for the start address of machine code
- 2 Bytes for the entry address of machine code

The file type byte signals the type of file which follows: 0 = formatted basic; 1 = ASCII code; 2 = binary. The ASCII flag byte is zero for binary files, non zero for ASCII files. Finally the Gap flag byte takes the value 1 for a continuous file and 255 for a file with variable gaps.

## COS Memory Map

The following locations are those used by the cassette operating system. Most are set up before calling out of the COS routines. Some, such as the status byte, start address and error code, can be usefully *POKE'd* from basic. All addresses are given in decimal. Where two consecutive locations are given, the value is 15 bit with MSB first.

- 118 Cassette IO flag. This has the value 255 when cassette input or output is taking place.
- 112 End of file flag. After a block is read, this location signals the end of the has been reached etc is set to non zero. (This is the location used by the EOF (-1) command in Basic.)
- 128 Cassette Status Byte. This can take three values: 2 means the cassette stream is stopped; 1 means the stream is open for input and 3 means it is open for output. This location can be peeked from basic to avoid both HC and AQ errors from colour.
- 121 IO buffer size
- 128-129 Header buffer address. The address of the filename block in memory. Set up internally.
- 134 Cassette block type. This is taken from the start of the block just read and is as detailed above.

- 135 Cassette Block Length. This is the number of bytes which have been read, or are to be written.
- 126-127 Cassette IO buffer address. This contains the address of where to put a block of data read or from where a block of data is to be written.
- 128 Used internally for calculating the checksum.
- 129 I/O error code. This contains a code relating to the cause of the error: 0 = No error; 1 = CRC (checksum) error; 2 = attempted to load into an area where there was no RAM.
- 130-132 Temporary locations used by the COS internally.
- 144-145 Cassette leader byte count. This is the number of bytes of \$55 copied in the leader. This is normally set to 128, but can be *POKE'd* to a larger value if you suffer from repeated I/O errors caused by over sensitive A/C cassette recorders.
- 149-150 Motor On delay. When the cassette motor on routine is called it performs a delay loop before returning, this is effectively the length of the interlock gap in data files. The 15 bit value in these locations are used for the size of the delay loop. Initially this is set to be about 0.5 seconds, again this can be changed to a larger value for cassette recorders which take a while to reach full speed.
- 455 Length of the filename. This is the number of significant characters in the filename and can range from one to eight.
- 460-470 Cassette filename. Is search for or to write out.
- 474-728 COS default IO buffer. This is an area of memory used to load the filename block and ASCII data blocks into. If this contains a filename block, then the following locations can be peered:
  - 474-481 First area of file found
  - 482 File Type Byte (see tape format information)
  - 483 ASCII flag byte (see tape format information)
  - 484 Gap flag byte (see tape format information)
  - 485-486 16 bit entry address for two code programs
  - 487-488 16 bit load address for two code programs

The following locations are different for the Tandy CoCo machines: 128-129 Motor On delay. The defaults are as for locations 149-150 above. 146-147 Cassette leader byte count. Defaults as for locations 144-145 above.

Next month we conclude our look at the cassette operating system with a list of all the relevant firmware routines and their entry and exit conditions.

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## Rule Britannia

**Program:** *Strategic Keydata*  
 PO Box 5, Lymington, Ames  
 Lincs LN9 4BH  
 Price: £1.95

IT'S refreshing to see that small software houses can still produce good material for the Dragon. And Keydata has put a lot of effort into this strategic game which asks you not to rule the world, but merely try to out-drive between the years 110 and 980 AD.

It is a familiar theme, and one that is easy to do badly, but here you sit up from the start when a suitably grand piece of music is played from the cassette through the TV speaker to get you into the mood for the game. It's a nice touch, but would have been over (if we dare) had we not seen it through the screening data loading.

Never mind, once loaded you're given the option of re-starting a saved game, and asked if you wish to make use of the high speed mode. My machine went cope with this, but even without it the responses were fast enough. The story is that the Romans began their bid to subdue from the country leaving 24 regions in England and Wales to fend for themselves against the marauding hordes of Saxons, Picts, Gauls and Scots. A numbered map is given for reference on the cassette in cart, with a high res display available to show you how

you're doing against the enemy.

Each province is capable of carrying various numbers of infantry, cavalry, mercenaries and so on, and the strategic problems aren't all leading the population or growing produce, but mainly mobilising troops to defend different areas under attack. You have to set quickly and have troops in the various island provinces as the Gauls in the north and the Saxons in the south will start trying to mass invade at once, and if they reach a province you'll have to move troops from elsewhere to try to retake it.

The single letter command (also listed on the insert) allows you to send out scouts, attack and counter attack, plead with them for help and so on. 13 possible commands altogether. Apart from using troops you can strengthen your provinces by putting up buildings. Though naturally the Saxons into the old city.

There are one or two minor limitations, such as the amount of information you have to sit through and try to take in at the end of each year when the reckoning is done, but that's no great drawback, and is for instance, you enjoyed *Dragon-Dance*. Along with you should give Britannia a try too.

Mike Gerrard



## Reeling About

**Program:** *Random Pools*  
 Money Software, 41 Tara  
 Road, St Austell, Cornwall  
 Price: £1.99

LET ME declare my prejudice right from the start and say that I've always thought one can benefit considerably to be told about the most useful one for a home computer, only that quality more interesting than using one as a coin-toss.

That said, *Random* is reasonably well documented with optional instructions (well, you've got to know how to solve the



mode.

The most interesting feature built into the game is the Randomness mode which when selected, will pick any of the 35 screens at random for the player's enjoyment (I).

The graphics are superb, if the screen looks cluttered at times it is due to the complexity of the game.

The game not only features moving and collapsing platforms, it also has electric walls, transporters, moving beams (is it *Doctor Kong*), switches and the usual run of everyday objects turned mutant (we have some televisions no longer — sadly — and cameras in it, but not a head) but they move in two dimensions — they move up and down as well as left and right.

The unclear instructions do not tell you that you have to

reach Haven! you'll, and giving you a score of 85 with each item costing you 10p. The highest prize you can win is £2, though I was hard pressed just to step in credit.

The program includes a HOLD feature and also a GAMBLE or COLLAPSE option if you manage a winning line.

GAMBLE means you can multiply your winnings if you can stop an arrow at a particular point on a scale.

You may also HUDGE from one to ten, though both hedges and holds came up rather too infrequently for my liking. Pressing the space bar 10 times in a row with no wins or holds and no hedges is hardly a thrilling experience.

*Random*'s best feature is the graphics, which scroll round very smoothly indeed, but even at £1.99 I wouldn't be gambling my pocket money on this one.

Mike Gerrard



## Screaming Abdabs

**Program:** *Screaming Abdabs*  
 A & P Software, Canal Side  
 House, Woodcote Street East  
 Bournemouth, BH1 5JD  
 Price: £2.95

IF A & P Software continue at the rate they could very easily become a top Dragon software house. First the excellent *Chuzzle* and now this superb *Abdabs* game.

The classic blow your type of game is one of my favourites (that gives this game a distinct advantage). However, even those who mock this software breed will not be able to deny that this is an excellent design

and executed game.

As has been said, it is a letter game consisting of 36 very complex screens, each more challenging than you are at first led to expect, and to negotiate these screens you get five lives plus a bonus life at 5-000 points.

There is an option to be helped or ignored, one to four players and although undocumented, playing it changes the colour set.

There is a pause facility but for some inexplicable reason it seems not to work when playing the game in keyboard

mode. The most interesting feature built into the game is the Randomness mode which when selected, will pick any of the 35 screens at random for the player's enjoyment (I).

The graphics are superb, if the screen looks cluttered at times it is due to the complexity of the game. The game not only features moving and collapsing platforms, it also has electric walls, transporters, moving beams (is it *Doctor Kong*), switches and the usual run of everyday objects turned mutant (we have some televisions no longer — sadly — and cameras in it, but not a head) but they move in two dimensions — they move up and down as well as left and right.

The unclear instructions do not tell you that you have to



# Assembly points

**Program:** Addressman, Dreamer  
or Software 32, Dreamworld  
Road, San Jose, Calif. 95128  
(415) 255-1085  
Price: \$12.95

A FREQUENTLY asked question is "Which assembler package should I buy?" One of the best and most popular to date for the Dragon has been the Dream range. This was originally marketed by Dragon Data as Addressman on cartridge and in two parts. Dream and Dreamworld are cassette. Since the demise of Dragon Data the authors, Computer Software, have taken over the marketing and are now giving Addressman as a single cassette cartridge or Dragonsoft disk.

The cassette version of Addressman is reviewed here. The manual supplied is extremely well written and produced. It seems to be written for word oriented to that is directed by Dragon Data, but at least Computer have made it a decent one. Dragon Data's manual was only four inches by three inches. There are plenty of examples sprinkled throughout the text with the mandatory program to fill the screen with a particular character — why do all assembler manuals have to include this program?

Addressman is designed to be the counterpart with Dream program and is loaded into memory RAM after issuing a CLAR statement. The lower 4096B is set the more space you get for the assembly language text. The first section of Addressman has files you in the screen editor. Dream does not use line numbers at all and the editing commands are quite different from the Basic line editor. All the keypad characters now have subscripts and the Caps lock works backwards which means that shift+A gives lower-case "a".

The cursor can be moved to any part of the text by using the arrowed keys. Moving on the top left corner of the screen causes it to scroll up or down and using shift and an arrowed key gives a much faster scroll for quickly locating text.

Assembly language commands are typed into one line and can be entered as dreams with each field labeled to the

correct column to make the program easier to read or just typed normally to save space leaving characters as very easily done. Left-right arrow shuffles the characters to the right of the cursor along to make space. There is however an automatic wraparound of text so that text does not character left of the end of the line get lost.

The Dream editor also has a number of commands which are all preceded by the Break key. For example Break+I will insert a space line ready for more text and Break+strg will find the first occurrence of string after the cursor. Whole blocks of text can also be marked and copied, moved or deleted. Once the text is copied it can be pasted into any line using the Copy+D command. Comments lines can also be marked and printed.

The program is assembled using the Break+A command. Dream allows labels of up to six significant characters. During the second pass a listing of the assembled program is output showing the address, op codes and assembly. Errors are given as one letter codes and the listing stops at an error until a key is pressed. The listing can also be printed by pressing Break and slowed down by pressing B.

A new set of commands is now available preceded once again by the Break key. Break+P prints out an assembly listing of the program, and Break+X will run the program just assembled from the beginning or from the address of a special label starting with an X character. A nice feature of the assembler is the PUT directive which allows programs to be assembled to run at one address but to be stored at another. Useful if you want programs which will run where Dream is loaded.

The Break+O command takes you into the third section of the Addressman package the Dreamworld monitor program. Again all commands are one letter long and are followed by one or more parameters. Numbers may be entered as either decimal or hex.

Dreamworld allows a number of Breakpoints to be added into your program. These allow the program to run normally until the Breakpoint

address is reached. Control is then passed to Dreamworld which will display a list of the CPU register contents and the next command to be executed up to 10 instructions are allowed and then are automatically reset when the program ends.

Another method of testing programs is using the tracing facility of Dreamworld. The 6800-cpu operation is watched by the tracer which can associate single instructions and display the cpu register contents between each. Alternatively instructions can be executed a set number of times or until the contents of a memory address change. Single stepping is a very powerful tool for debugging programs and is particularly well implemented in Dreamworld.

As an overall package Addressman is hard to fault. The editor is a joy to use and makes lines of text enter so simple. The assembler supports all the instructions and addressing modes of the 68000 processor. All the popular assemblers do that. The data version of Addressman loaded Dreamworld looks even better allowing assembly to be halted giving the potential for huge programs to be assembled. It is hard to find fault with Addressman it would be that it only allows lines to be 32 characters wide which leaves only a few characters for comments and the fact that there are no built-in commands for saving binary code (assembled programs) to tape although this is quite possible using CSASIM from Basic.

For the Addressman Goldmine or Dragon Data Dreamer earlier. Dreamworld Software have now released a program called Dreamer. This is a program written in Basic which allows Dream to be loaded onto an 84 channel bit mode line.

The idea behind Dreamer is that the Dream editor is so good it could be called a single word processor so text is prepared using this and then printed out by loading in Dreamer. The program takes every two lines of text and prints them as one. There is no formatting or right margin facility available although this could have easily been an alternative within the Basic program.

The program allows a range of characters to be sent to

the printer before printing and at the start of each line for example the tab character would be useful on 80 column printers.

Dreamer does not make Dream a full wordprocessor but it is ideal for anyone who already owns a package in using Dream and who wants to use it to prepare simple documents such as letters or memos. Even at £4.95 Dreamer seems a little odd purchase for a program written entirely in Basic but it is a useful addition to the Dream range.

Dean Castle

## Slide

**Program:** Slide, Pocket  
Program Software 45, Turo  
Road, St Austell, Cornwall  
Price: £1.99

£5.00 turns your TV screen into one of those pocket puzzles where you have to push pieces around in order to reform a picture or sequence of letters or numbers. In each of the three puzzles there is actually one blank space to help you slide the different pieces around. It is a complete non-starter. Mind you it's not much of a starter as it is. You use the arrow keys to move the blank piece round the board — a quite logical arrangement whereby the down arrow moves it up and the left arrow moves it right and so on.

Each puzzle is a set by seven and graded for difficulty. The result being a straightforward sequence of numbers, next several hexadecimal numbers from one to 25 and then a map of the good old USA. Pressing B at any time will show you the correct solution and the steps on the screen for as long as you care to keep it there.

I find the type of puzzle exceedingly tedious and because of this quickly realised are playing fast which is that you can't get a game to choose another option. You have to reload or risk your loss with the reset button. Even if you like this type of game it would seem a pity to restrict the rest of pocket variety much more than Dragon's left disk and VDU which I find hard to resist my pocket budget come what.

Attila Garrard



# Domino doctors disks

**Program:** Disk Doctor 112  
Rogers Avenue, Taunton  
Somerset TA1 1PB  
**Price:** £79.45

DRAGONDOCS is as reliable as any other "D" disk system, but does not get corrupted especially if you are prone to spilling coffee all over them! So you have your treasured program on a disk which has just fallen in the milk shake and you've forgotten to make a backup up of the disk. Try to run the program just gets you an "IOF error" — what do you do? Answer, get the Doctor — well the Disk Doctor anyway.

The first real Disk Doctor program I have seen for DragonDOS is from Domino Computing. This is supplied on two double-sided disks which can be inserted either way up giving you a total of four copies of the program. The double-sided disks are really just single-sided disks with the write-protected notch and index hole punched out so that the unprogrammed side of the disk can be read.

The purpose of all this is because the Disk Doctor disk cannot be copied because some of the sectors have been formatted in a format unknown to DragonDOS, so the Backup command fails. Unfortunately there are so many sticky labels all over the disk that it frequently got stuck in my drive and had to be pried out!

The software is a mixture of protected Basic and machine code routines. As well as the Disk Doctor itself, there are a number of utilities offered. For example, all the label files can be restored providing no new information has been put on the disk since the labels were erased. The files appear as NAME 101, NAME 102 and so on in the directory.

Another option allows you to view the files which are flagged as being erased from the disk, but are still in the directory. Output can be sent to the screen or printer. All the files on a disk can have the protection set on or cleared in one go using the Protection option.

One of the least useful utilities is to build a directory listing to the printer. That is a DRI 12 gender rather than screen. What a waste! Well, I don't know if I can help Disk Doctor. A much more useful utility

gives full information on an error in the directory table. The menu type start and accurate addresses are displayed together with the track and sector numbers used by the file.

DragonDOS owners have probably found that whenever they try to run a program to disk, with no name as in BASIC, but you cannot tell it off or rename it. Another of the utilities on this disk will rename all null named files to DOMINO1, DOMINO2 etc so that you can rename them or list them all.

The final utility will verify all tracks and sectors of a disk, reporting faulty ones. I don't think, strictly by using the SBRAC command and trapping disk errors.

Some of these utilities will probably be of use to most users from time to time, although most could easily be written yourself given the DragonDOS Programmer's Guidebook. However, what makes this disk worthwhile is the Disk Doctor program.

This is fully automated and works basically as follows: The program attempts to read through the corrupted disk, noting which sectors cannot be read. It then checks through the directory and finds which files use the corrupted sectors. These sectors are replaced with clean ones containing REM statements on the repaired disk.

The program is not 100 per cent successful at restoring corrupted disks, but performed very well on my two corrupted disks. Disk Doctor and its Utilities will work with either a single or double drive set up. You are asked how many drives you have at the beginning of the program. Interestingly, the program will not perform operations on itself!

If not for a couple of minor points, I would suggest that Disk Doctor is available there for all DragonDOS owners. However, the price is not realistic at £119.45. The double-sided modified master disks of the disks the program is supplied on, and the manual is not up to much at all. However, the manual I saw was only a draft version so perhaps it will be transformed into something decent for the production copy.

Disk Doctor is a very useful and well written program which will be gratefully applied to users. If you can justify the cost then I recommend it. A definite Disk Doctor of the prog.

There should be no other short by

Brian Gudge



## Robin's no robbery

**Program:** Robin Hood Pocket Money Software 41 Thuro Road, St Austell Cornwall  
**Price:** £1.99

OUT OF the recent batch of Pocket Money releases, Robin Hood was one of my favourites, one of the few I'd actually go out and buy. Okay, so it's an inferior version of The King, but it's still great fun to play and has many an amusing touch about it. Instead of rescuing the Woods from the clutches of the evil gentry, you're rescuing Maid Marian from the clutches of Nottingham's castle, in stead of barrels you're bowled over by soldiers.



which the evil Sheriff tries to drop on your head from the turrets at the top of the screen. He does follow your movements left and right before dropping the rock, and while that's not too much of a problem when you're very close at the bottom, it creates a bit of a bit for you drop up.

Rather than a continual pathway with ledges, this is a platform-type screen with Robin having to leap from place to place, trying to avoid a lot through to the most beneath, but trying also to pick up the bags of gold and objects for bonus points, and the key that you'll need to re-enter the castle. Marian. The top level of platforms also has several arrows pointing that way across, just to add to the problems I thought if you do

get to Marian, get right, so I don't think there's a bonus object.

Anyway, that I don't know, but while I'm sure it won't have the complexity of The King or Maid Marian, it's still a fun little robbery no one.

Mike Carrard



## The pits?

**Program:** Pit Fiend Pocket Money Software 41 Thuro Road, St Austell Cornwall  
**Price:** £1.99

CAN YOU get your wits down the pits and collect together the five pieces of a broken shield that have been scattered about the five different levels of the dungeon depths? You use the arrow keys to move your man round the maze (corridors, through brick-like structures) with the U and D keys to move up or down a level, provided you're standing on one of the appropriate staircases that link the different levels. Move over a bit of the shield and it's laid in on the inter-shield at the foot of the screen.

You start with three lives, and as in Marrowed games of this you can choose later three different coloured skeletons (though anyone choosing the bull screen will need their eyes having after







wards it ran before. A supply of oxygen is running out at the rate of the screen; within you also have to contend with the pit. Finally, the dinosaurs. Poachers let ghosts which roam the corridors. Your dilemma against them is to blast the space bar to send a spawning time in that direction while trying to kill. Or it may be a becoming, as it does come beyond them to you.

The main pods round the corridors well enough, and the game is quite tricky without actually having the climbing back for more. Pit itself is about average among these recent Pac-Man. Money releases more or less what I expected. The £1.99 price is quite good. Okay but not worth a full price release.

Mike Gernsey



## Money, money

**Program:** Daybook Cash Book Sales and Purchase Ledger Software Design 50 Woodway Collier Hudson Road West Yorkshire  
**Price:** £14.95

SOFTWARE Design has released a suite of accounts programs for the cassette-based Dragon 32 and 64. The software consists of three packages: one for Daybook, one for Cashbook and one for Sales and Purchase Ledger. The author has provided separate versions for 32K and 64K machines on either side of the cassette rather than testing how much memory is available from within the program, presumably to save memory indeed that whole philosophy behind this software seems to be memory conservation.

The general presentation is to say the least poor. The cassette are supplied with brown paper inserts and the instructions are computer printed on a sheet of this brown paper. The instruction sheet states that "having purchased a computer accounts program it is assumed that the user has some knowledge of both and you'll certainly need it."

Once the basic program has loaded a very short piece of machine code is then also loaded and the main menu is displayed. There are 10 options available in all of the programs. The first program which should be used are the cashbook to enter credits and debits and the daybook. Option 1 is used to enter new data, sample form fill techniques are used to enter the name, date, reference, discount, cash, bank and so on of each record. The error checking is very thorough and if the amounts entered do not balance the message "Incorrect Entry" is displayed.

Having entered the data, option 2 allows you to search for a particular record by the name, date or amount. The Daybook program simply displays an alphabetical list of all the account names. The search seems to work quite efficiently for a basic program.

Option 3 allows you to browse through the records using the arrow keys to scroll entries up or down. The option uses the Dragon's display quite well with a simple row drawing method. The record currently at the top of the screen can be viewed in full or edited if required. The editing procedure is rather clumsy; each field is displayed and given a number, the user then enters the field number to be changed and the whole field is redisplayed.

Selecting the sort option allows an alphabetical or date sort to be performed on the data. This can take quite a while with a lot of data in the database. Records can also be printed out in form suitable for your accountant to complete.

One of the best features of these set of programs is that files are interchangeable across from the daybook and cashbook to the ledger program. The save and load options which saves a lot of unnecessary typing. An exit most of the options, pressing Enter to any prompt will return you to the main menu, useful if you select a particular option by mistake.

A lot of effort has obviously gone into the software and indeed it seems to have all the features necessary to Computerize the accounts of a very small business or individual. It seems a shame that the software is spoilt by being so un-user friendly simply to save them any. It is not hard to assume that the user will be familiar with

## Fearless Freddie!

**Program:** Fearless Freddie  
Mandelst 41 Thuro Road 50  
Aston Coventry CV2 5JE  
**Price:** £1.99

A CONTROVERSIAL game in my house this one. People either seem to love it or hate it — my advice is use it before you buy.

I think it's great if used. The idea of the game is to collect all the objects on a screen avoiding the various monsters. It is Mandelst's Only One game is different from its revived predecessor.

Finally, it has no jump, only left and right. Upwards movement is obtained by getting onto the platform you can fall so long as you don't end up in a cauldron or a fireball.

In many respects, in fact it beats most of a similarly to A

& P's Charlie Egg (which I am unashamedly informed was also designed by Matthew Smith — but no doubt you will correct me if I'm wrong).

The graphics seem to range from the great to the tolerably bad. The screens are all well designed, the textures introduced sequentially and neatly and when you are used to the game there is still level to go to play which appears to go on for ever.

The character is an incoherent mess graphically, as are some of the foods and I have already found one bug in the game as well as a couple of strange lines but despite that I still enjoy leading the game up to a quick touch of the clearing does!

Jason Odum



## It's time for tea!

**Program:** Fearless Freddie  
Mandelst 41 Thuro Road 50  
Aston Coventry CV2 5JE  
**Price:** £1.99

THE STAR of my lunch hour Pac-Man. Money this is a good game, programmed better than a lot of those relating for 32K on Mandelst's main range.

The game however does not have enough sophistication to be worth the higher price and so is justifiably placed in this range.

The use of the game is to control a tea pot which must not catch falling tea drops and then avoid deadly angry cubes. The game has several shades of Freddie. Steven Dastell writes it out plays considerably better than them.

There are three screens which repeat in turn each time being more difficult than the last. They are well designed, certainly fast but very challenging.

There is an option to start at any screen and a high score table that keeps the top five only of those initials in order.

The thing that fits the game out of the mediocre is its also fairly superb look. It is very nicely laid out, plain of its format without obscuring the notes and has a very clever compartment layout using a sub-screen/border technique to great effect.

The game almost gets a five out of five rating but doesn't have that additive quality to give the player the urge to load it up. When it is at the time more game syndrome operates, although it is a matter of the urge to load.

In short then, a good game that handles nicely and looks great.

Jason Odum



computers or even accounting to that extent. The instructions are wholly inadequate, even pointing out about how things are stored within the Dragon's memory. Very interesting to a business user, when no-one near enough has been used about the program's themselves.

All this is not to say that the

software is not useful. If you are prepared to work out how to use the programs largely for yourself, and have a cassette based system then this suite of software will serve as an introduction to computer accounting.

Brian Cudge





# DISASSEMBLER HEX DUMP

13211	84	8D	8D	8D	8F	8F	84	8D	A4	8D	737
13221	81	7F	25	88	81	38	33	84	8A	88	737
13231	28	84	81	48	28	82	84	8F	8D	88	742
13241	8F	1F	18	C4	1F	34	83	84	8F	8D	742
13251	88	8F	8C	84	88	34	84	3F	88	88	742

OVERALL CHECKSUM TOTAL 3847

The values are listed in the Dragon manual (pg. 135-137). With shift key on the normal values. Byte 13220 currently contains 75 (D). To change it to say 17 (F) F0K1 1322040

Loading machine code programs with offset

This facility enables relocatable machine code to be positioned elsewhere in memory. Loading from cassette with offset (+value to be added to the LOAD and EXEC address) is described on p. 136 of the manual. Note that OSK loading with the optional parameter a DIFF-HIGH (and exec) from tape loading.

To take Belgian reader Maarten Van Wamelan's enquiry: Do you know a way to put a machine code program higher in memory: say the disassembler at address 28000?

1) Calculate the offset=required load address - current load address = 28000 - 12001 = 15999

2) CLEAR 330,28000

3) CLOADM "program", 15999

4) The address that a program is saved from becomes its normal load address. Should it be preferable to normally load the disassembler at this address, save it now.

CSAVEM "newname", 28000,13230,28000

Subsequent CLOADs without offset will load this version at 28000 (as mentioned in the article: same identification of load address as part of the program name is a good idea: memory — eg D328000).

Should you have completely forgotten a tape program's load address and do not possess a second tape, a backup program CLOADM it then from the keyboard: enter PRINT PEK (157/284 + PEK (184) PRINT PEK (156/284 + PEK (157)

The former gives you the EXEC address of the newly loaded machine code program which — unless you are unlucky! — will also be the LOAD address. The latter gives you the END ADDRESS+1 occupied by the program just loaded.

Loading machine code programs at a lower address in memory

EXEC will not allow you to exclude a memory page with the offset (D) since (a) it's not as easy as it seems to check the system using the magic number 88008. Example: load the disassembler at 10800 instead of at 12001

1) Take 88008, subtract from it the normal load address, add to the result the required

load address = required offset = 88008 - 12001 = 76000 + 10800 = 86808

2) CLEAR 280,10800

## Sample dump taken using amended program

ADDRESS	HEX	LABR	LABEL	Amended instruction
02FC2	178AA6	LABR	LABEL	→
02FCD	208A	BRA	LABEL	
02FC7	0180	CHPA	02FD1	
02FC9	2A84	BNE	LABEL	
02FCB	EC8CAF	LDD	LABEL,PCB	
02FCE	EB8CB4	STD	LABEL,PCB	
02FD1	17FF34	LABR	LABEL	
02FD4	EC8CAF	LDD	LABEL,PCB	
03068	0480	LDA	0480	
0306D	00000F	JSH	0000F ea	
03070	000488	LXI	000488	
03073	A488	LDA	,X+	
03075	017F	CHPA	007F	
03077	238E	BHI	LABEL	
03079	0128	CHPA	0028	
0307B	2284	BHI	LABEL	
0307D	0468	DFA	0468	
0307F	2804	BRA	LABEL	
03081	0160	CHPA	0060	
03083	2582	BCE	LABEL	
03085	048F	ANDA	048F	
03087	00000F	JSH	0000F ea	
03089	1F18	TPH	X,D	
0308C	C41F	ANDB	041F	
0308E	2485	BNE	LABEL	
03090	0480	LDA	0480	
03092	00000F	JSH	0000F ea	
03095	000488	CHPX	000488	
03098	240F	BNE	LABEL	
0309A	39	RTB	03073	

3) CLOADM "program", 86808

4) Again, the program may be saved from this position to become a version with 110 as the normal load address. CLOADM "newname", 10800, 13250, 86808

Why hex dump listings rather than source code?

Perhaps the Editor ought to answer this one, but Maarten also asks why there is such a proliferation of number dumps when readers are keen to practise with their Assemblers? Suffice to say that I took the three attempts to get the disassembler article short enough to be accepted in the first place and the source listing is 12 pages long. <sup>100</sup>

# MIKE GERRARD'S ADVENTURE TRAIL

If YOU'RE borrowing the lack of new Dragon adventures over the usually quiet summer months from Peter Marlet, The Scott Adams conversions from Adventure International are hard to be almost ready, though it is going to be the stage where I'll continue when I see them. As a result, I've been looking at an old title from Presoft called *Dont Panic*. I picked this up from Presoft's proprietor Harry Whitehouse at the second CSO show where the two-adventure tape was on sale for a very reasonable £2.50. Harry was very modest about the contents, describing them as old-fashioned text adventures, but as they were unfamiliar to me, I thought I'd give them the once-over and I'm glad I did.

Both adventures load together and you're asked at the start if you'd like to tackle *Towers of Dread* or *The Ice Kingdom*. While a might appear from that that each of these is only half an adventure, in fact they do take up about 24K of memory altogether and of course much of the actual code program is the same for both, resulting in duplication.

*The Ice Kingdom* sends you to a search of the *Tower of Understanding*, which has somewhere to the east of the Black Mountain, and that's all you're told about the game. You start at your own village, with nothing at all to aid you. The screen description, visible objects and obvious exits are all stated at the top of the screen with you. What now? prompt begins.

I wandered through some leafy paths and dark woods, picked smart economy, as some of these appear in both adventures. I'll find a jeweller's but and our old friend the sea. Also some bats and flowers. Then I went up into the mountains to find an alien planet, then the bear in the cave, and no progress for guessing what he wanted. Unfortunately as I was just about to go past him, the program crashed in a syntax error. I must stress that this was due to some garbled data on my copy of the tape, and not to a fault in the program itself, so I'm sure Presoft will quickly replace it.

*Towers of Dread* worked perfectly and allowed the to see that there are quite a lot of solutions and interesting problems hidden away in these two titles.

The second one begins. There is an old legend which states: When the Eaglesmen of Alabaster cross the Obsidian

Towers, the old curse will be lifted. Your monitor has sent you to find the old sage of the woods and to test the legend.

I didn't take me long to find the old sage, though he didn't have any old goods with him, and he gives you some helpful advice which is a last not to follow straight away. After that, you've explored every rock and every bird in the 51 gardens, seen mountains and camps of the rebel band of wizards. I quickly found out the large gales making the Obsidian Towers, but as there was no fire, a magic sword coming from behind him and I didn't think I was quite equipped to deal with it yet, I left them alone.



The lead in these two adventures is very brief, and the word recognition and other features are fairly primitive, as Presoft admits, but nevertheless for £2.50 the pair they're worth having if you haven't seen them and are desperate for adventures.

Even if you are desperate, I wouldn't recommend this month's only new title, *Escape from Hell House* from Lucas Software. This comes with a version of *Avatar* on the other side, and to get that out of the way it is very crude and slow, with poor cutscene detection, poor responses from the laser balls to movement keys/controls, and finally you don't actually see when your hero is moving.

On to the adventure, for what it's worth. The contents is summed up very easily. You are trapped in Hell House. The house has three floors with four rooms on each floor. You must solve the problems of escape. On each of the three levels, there are rooms to search, adults, meet and meet of you with each move you make using up 10 of your 200 energy units. There is some food in one of the rooms, and this adds to your energy level when eaten. There are 16 commands available to you through single letter inputs, plus movement commands: go-P for instance means, Pick it up, while M means, Use the map(s), which does tend to give part of the game away.

There is an endless deal to looking on each floor, curious enough with being rooms, paired by a spelling mistake, it does he get you the hints for the past word and very that did no good your past. This gives you some indication of the level of the game, which is pretty low, and pretty limited.

But on to lighter things, and readers letters. It is obvious that many of you are stuck in *Mathias* and the *Minotaur*, judging by the requests I've had for hints, sheets and those should all have reached you by now. One went to Tim Lott of The Cottage, Tobias, London Road, Brighton BN1 8QA, who in addition is having trouble with a game called *Quest* from Dragon Data (DD). This is a new one to me, but Tim's problem is not at all and pressure but of TIG Error in 5130, just as he's getting towards the end of the game. If anyone else has come across that and found the correction, please then can you let Tim know?

Tony Barker of 71 Crown Road, Epping Essex SS16 5QH asks for text adventures with lots of data and games to play, as he prefers the *Fighting Fantasy* style to straightforward adventuring. I've recommended *Minotaur* and *Escape from Hell House* at CSO. Second is the *Adventure* (AD) (a *Ready Computer Games*) and as a lesser extent *Keys of the Wizard* (KS) (Microdisk). This isn't really my type of game, though, as if anyone's any better suggestions why not write to Tony direct?

Someone offering and asking for help is Tim Unwin, 11 Mersea Avenue, Southend-on-Sea, Essex SS11 1BU. Tim can give help with *Ring of Darkness*, *Towers of Dread* and *Dragon* II, and it means needs help



## GAMESMANSHIP

For Oregon 3264 (Tandy version 8)

### APPARATUS

Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00

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### ADVENTURES

Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00

### TOOLS

Full kit	£120.00	£120.00	£120.00
Full kit	£120.00	£120.00	£120.00

### UTILITIES

Full kit	£120.00	£120.00	£120.00
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## Stylograph

I USE a Dragon 64 6800 system with double disk drive and a Tandy Darg Wheel 88 printer with external Decos 104 printer buffer.

Everything works together very efficiently except that I'm unable to access the sound sign on the Tandy printer when using the Stylograph word processing program. The printer is a 1000 compatible 104 character offset with a font selected by Hex 3 and the sound sign coded 067 by Hex A3.

I can send Hex A3 to the printer meaning I print a pound sign on the 6800 operating system using the "display" command. But Stylograph seems to suppress code A3 when I try to send it using a printer control character defined by the PC command. I get a hash instead of a pound sign! I've also tried to persuade Stylograph to recognise Hex A3 by using Stylo; but again to no avail.

David Taylor  
67 Adam Road  
Wimbledon  
London SW19 2AG

THE PROBLEM with Stylograph seems to be that it will only allow 2 bits for characters; the eighth bit being used to signal style control codes perhaps. The published method of redefining the printer character codes by editing the STYPS file, will not work for codes over 127 decimal.

Unfortunately, I've not been able to find a way of reassigning this printer code within Stylograph. Perhaps one of our readers knows of a solution?

## OS Error

I AM using my Dragon 32 to produce story outlines, memos, letters and the like for my remedial pupils. I cannot get more than 255 characters in to the machine before I get an OS ERROR message even though I am using different strings. I know I can only get 255 in one string, but why only 255 altogether? The handbook is no help. It says use CLEAR, but I lose all, of course.

David Jefferson  
Barnes Lane School  
Fulbourn Way  
Dunstable LU5 5BH



HOW ARE you in finding that any one string can only store up to 255 characters. However, the overall number of characters allowed for all strings has to be set by the user — this is defined as "String Buffer".

The power up the Dragon gives you 780 bytes or characters of string buffer, or even if you use different strings. The total number of characters that can be stored before an OS ERROR message is only 255.

The CLEAR command is used to change this. For example, to give you 65000 characters of string space you need to add line 5 CLEAR 6500.

## Sound signals

I'VE HAD lots of problems with the sound in my Dragon 32. In fact I know that the computer works perfectly so it seems that the fault is on the TV, which is a British make and produced in Great Britain. I've also tried the Dragon on a German TV. SAGA makes but I've had the same problems. I wonder if you could advise me on that, because I do get a perfect display.

John Maclean  
23 Alpacas Drive  
Amersham  
BUA 2JH, 23 Alpacas  
Bucks

THE FIRST thing to check is whether you have a signal at pin 5 of the monitor socket. It isn't that the people have to remember in the sound generation circuit, which could be any one of a number of components, if you get round to the monitor socket but not through the TV, then it is probably the Modulator which needs replacing.

## Audio On

I HAVE come across two problems while doing machine code. How is it possible to force Audio On and Audio Off from machine code?

Is there a machine code routine somewhere to access a header and program? If so, where and how could I locate them within my code?

Paul Burgen  
14 Moorcroft Road  
Aldershot  
Hants GU11 2JL

THE AUDIO ON and OFF commands can be accessed by the following routines in machine code.

AUDIO ON 47852 (Dragon) & 45421 (Tandy) (B = 8)  
AUDIO OFF 47811 (Dragon) & 45388 (Tandy)

To load a Basic program whose header has been corrupted, position the tape immediately after the header and type:

**MOTOR ON: EXEC 48714**

The program will then load and can be re-saved correctly.

## Division?

I HAVE been trying to learn machine code but despite reading three books on the subject, I have been unable to find out how to perform division (except by hand) or how to handle fractions (such as might occur during iteration).

Can you explain how to do this, or point me to the division of some more information literature.

D Edman  
14 Blenheim Way  
Roxton

I SUGGEST you get a copy of **MSB Machine Code Programming** by David Barnett and Brian de Granville. This book

relates to the Dragon, and has a section on multiplication and division, explaining clearly the principles involved. Two programs are listed, one for 8 bit and one for 16 bit division.

## Circles

AT THE moment I am trying to write a program to draw a given shape. However, I am having difficulty in drawing the lines from the centre to the appropriate position on the circle. Please could you explain how to do this.

Tony Chapman  
Greenham  
Luton

THE FOLLOWING Basic program can be used to produce six charts. It can be expanded to produce different charts and much. The value of ST and SR should be the start and last positions in the segment to be drawn, as used by the BASIC CHART command.

```
30 DEF FSR(X) = 120 + SR + SR * (X - 1) / (ST - SR)
40 DEF FSR(X) = 90 - SR + SR * (X - 1) / (ST - SR)
50 DEF FSR(X) = 120 + SR + SR * (X - 1) / (ST - SR)
60 DEF FSR(X) = 90 - SR + SR * (X - 1) / (ST - SR)
70 GOTO 120, SR, ST
80 GOTO 120, SR, ST
90 GOTO 120, SR, ST
100 GOTO 120, SR, ST
```

## Fast mode

COULD YOU tell me how to get a program from cassette which was saved accidentally in a slow speed (usually FSR 65457 B)? The program was extremely long and took many hours to type in.

Ray Johnston

PROGRAMS which have been saved whilst in the fast mode cannot be loaded back whilst in the fast mode. The Dragon must be put in to the highest speed mode available, which also has the effect of loading the screen display.

Use the following commands to load your program back in:

**AUDIO ON: FSR 65457 B: CLOAD**

The Audio On is so that you can hear the program loading, so you will not be able to see anything on the screen. Once loaded press the RESET button and by loading the program, it'll have loaded correctly then save it at the fastest speed.





Received 12 November 2003; accepted 12 November 2003

# Competition Corner

Address to Competition Corner,  
Dragon User, 12-13 Little Newport  
Street, London WC2N 7PP



**Dragon Lee with another mathematical conundrum — 15 copies of *Chuckie Egg* and *Screaming Abducts* from *ANF* software to be won**

increased by a factor of eighty more than three. Thus the average result over a number of tests will be in the order of 3642 — in other words the number will gradually increase without limit — a fact which we know by experiment to be wrong!

The fallacy in the argument is fairly easy to spot. When an odd number increases by a factor of 24 + 1, it must become an even number, and so will immediately be halved at the next step. So an odd number has a halving of only 1/24 (plus a tiny bit more), and if this is now averaged with the factor of 0.5 in the case of even numbers, the overall result will be a decrease of about 0.75 per step — a figure which approximates roughly to that obtained by actual experiment.

The third possibility that was mentioned last month concerned the endless loop that would occur if a number was reached that had already occurred during the calculation. This is a distinct possibility and again there is no definite proof either one way or the other. As this hasn't caused actual experimenters to argue against such a

set of numbers, but why, again? Surely, while in the vast infinite sequence of integers there may be such a set of numbers that will form an endless loop (so far though they have eluded detection). Maybe some keen Dragon User will find one!

It may be thought that one way to understand the problem is to study it at reverse. That is, begin with 1 and trace each subsequent number backwards. Unfortunately this brings with it certain problems. Every so often the track divides into two branches. For example, 11 can only lead on to 20, but 20 can branch to either 44 or to 7. Algebraically, any number of the form  $62 + 4$ , where 2 is any positive whole number, will divide at this way. It is not difficult to realise that these ramifications will soon become very dense. The accompanying diagram shows the chain of such a tree, containing just a few selected values. If the theory that all integers finally reduce to 1 is true, then this diagram will have to extend upwards to infinity. Also, every conceivable positive integer that existed will be used once, and never only, at its own unique point on such a tree.

For the competition this month, consider the 231-step number  $10^{231} + 1$ . That is, 1 followed by 230 zeros, followed by 1. If you want to start with this number, can you determine how many steps would be needed in order to reduce it down to 1?



## Prize

**FIFTEEN** entrants can win copies of both *Chuckie Egg* and *Screaming Abducts* from *ANF* — two excellent arcade games for your Dragon!

## Rules

**10 WIN** copies of *Chuckie Egg* and *Screaming Abducts* you must first show the answer to the competition, and secondly show how to solve it with the use of a Basic program written on your Dragon.

Please do not send in a contest containing your answers.

Make sure your name and address are clearly printed on your entry and mark the an-

velope September competition.

As a consolation, complete the following sentence in 10 words or less: "I want to go to work on a *Chuckie Egg* machine."

Entries must reach Dragon User by the last working day in September. The winners will be announced in the December issue. The editor's decision is final, and no correspondence will be entered into.

## June Winners

**GRAHAM BEEN** of Bedford has won tenfold copies of all the *Scott Adams' Classic Adventures* on the Dragon, plus *The Walk and Spideeman*.

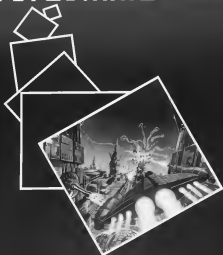
Fifteen other Dragon User readers have won themselves

copies of *Scott's The Sorcerer of Clamagrouse Castle*.

They are A & S Randall of Lowestoft, R J Tinkman of Sale, Chen Zhewei of the Beijing Institute of Aeronautics and Astronautics, China, John O'Leary of Macroom, Sim, Simon Capelle of Blois, France, Mrs D Thompson of Etwick, St Amuseval of Basingstoke, Rene Lablane of Devil le Barre, France, Gary Codrington of Chelmsford, Gregory Gallagher of Shering, Philip Murphy of Leedgate, Graham Rice of Palsford, Ross Hamilton of Chandlers Ford, John Rust of Mold, and Harry Gibbons of Barking.

They will be receiving their prizes in due course (although it may take a bit longer to get to China!).

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